

AMATEUR SATELLITE REPORT

AMSAT's Newsletter for the Amateur Space Program.



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Shuttle 51F Operating Opportunities Announced

NASA, AMSAT and ARRL have announced tentative operating opportunities for the mission of Tony England, W0ORE, and John-David Bartoe, W4NYZ. As previously detailed, actual voice operating time for the astronauts will be quite limited due to the heavy "official" workload. This is reflected in the schedule below with the majority of transmissions being SSTV scan converted images from the NASA on-board video. This will be the first occasion on which SSTV has originated on a shuttle.

The majority of voice transmissions will be with previously scheduled clubs and youth groups. This arrangement is in accord with the express wishes of Tony England so as to make the most efficient use of the limited operating time available.

The downlink frequency will be 145.55 MHz. If an open operating period is declared, you may attempt to QSO with the shuttle on 144.91, 144.97, 145.03 or 145.63 MHz. Listen to WA3NAN on the frequencies listed in ASR 105 for late breaking news on the operation.

The following data is courtesy of NASA spokesperson Chuck Biggs, KC5RG. ➤

New Attitude, Antenna and Schedule Mark August Operations

As previously announced, a radical attitude has been set on AO-10 to counter the negative effects of the most severe series of eclipses AO-10 has yet experienced. At press time the attitude had attained 230 degrees of longitude and -10 degrees of latitude in the Bahn coordinate system. This unusual orientation was calculated to be the best balance between electrical, thermal and operating requirements. The attitude will be essentially unchanged until late August or early September when the series of eclipse ends.

In conjunction with the attitude setting for August, Command Station ZL1AOX announced on July 13 that the 2 meter omni antenna had been selected for use for the first time since the early post-launch period. The omni will be in use from MA 35 to MA 80 on an experimental basis, according to ZL1AOX.

The omni antenna is on the satellite's Z-axis and was designed to have a uniform torus pattern in the x-y (spin)

STS 51F Amateur Radio Opportunities Launch: July 29, 19:23 UTC

Orbit	MET		UTC		Mode
	Start d/hh:mm	Stop d/hh:mm	Start d/hh:mm	Stop d/hh:mm	
47	2/22:10	2/22:40	01/17:33	01/18:03	TV & Voice
48	2/23:45	300:15	01/19:08	01/19:38	TV
49	301:20	301:40	01/20:43	01/21:03	TV & Voice
50	302:45	303:45	01/22:08	01/23:08	TV
51	304:20	305:20	01/23:43	0200:43	TV
52	305:50	306:30	0201:13	0201:53	TV
53	307:25	308:05	0202:48	0203:28	TV
54	309:00	309:30	0204:23	0104:53	TV
58	3/15:30	3/15:40	02/10:53	02/11:03	TV
62	3/21:30	3/21:40	02/16:53	02/17:03	TV
63	3/22:50	3/23:25	02/18:13	02/18:48	TV
64	400:20	401:00	02/19:43	02/20:23	TV
65	401:45	402:15	02/21:08	02/21:38	TV
66	403:25	403:50	02/22:48	02/23:13	TV
67	405:10	405:30	0300:33	0300:53	TV
68	406:25	407:05	0301:48	0302:28	TV
69	408:05	408:35	0303:28	0303:58	TV
73	4/14:30	4/14:45	0309:53	03/10:08	TV
78	4/21:50	4/22:25	03/17:13	03/17:48	TV
79	4/23:25	4/23:55	03/18:48	03/19:18	TV & Voice
80	501:00	501:20	03/20:23	03/20:43	TV
81	502:25	502:55	03/21:48	03/22:18	TV
82	504:10	504:30	03/23:33	03/23:53	TV
83	505:25	505:35	0400:48	0400:58	CW
83	505:45	506:05	0401:08	0401:28	TV
84	507:05	507:40	402:28	0403:03	TV
85	508:40	509:05	0404:03	0404:28	TV
86	5/11:20	5/11:30	0406:43	0406:53	TV
89	5/15:05	5/15:20	04/10:28	04/10:43	TV
93	5/21:05	5/21:25	04/16:28	04/16:48	TV & Voice
94	5/22:25	5/22:55	04/17:48	04/18:18	TV
95	600:00	600:20	04/19:23	04/19:43	TV & Voice
96	601:25	601:55	04/20:48	04/21:18	TV
97	603:00	603:30	04/22:23	04/22:53	TV
98	604:45	605:05	0500:08	0500:28	TV
99	606:05	606:40	0501:28	0502:03	TV
100	607:40	608:05	0503:03	0503:28	TV
101	6/10:20	6/10:25	0505:43	0505:48	TV
104	6/14:10	6/14:20	0509:33	0509:43	TV

NOTES:

1. UTC day is day of the month of August.
2. This is revision B.
3. Offset from prior launch schedule (12 Jul 85, 20:30UTC) to current planned launch (29 Jul 85, 19:23 UTC): 16 days, 22 hours, 53 minutes.
4. MET is Mission Elapsed Time

plane of the spacecraft. However, it is suspected the 2 meter omni antenna may have sustained some damage in the post-deployment incident although this has never been confirmed positively. Initial observations made with the omni showed a deep null but it was uncertain what this indicated about the condition of the 2 meter omni antenna.

The 2 meter antennas on AO-10 consist of the high gain array and the 2 meter omni. The high gain array is three two-element beam antennas, each a driven element and a director, phased to produce RHCP with about 8 dB gain. Because of the present attitude of AO-10, the 2 meter high gain beam substantially misses the earth during part of the orbit. Thus the omni will be used during this period to evaluate the results.

It is easy to tell when the omni is in use since the fade rate is one third of that resulting from the high gain array. The spin rate of AO-10 is now about 30 rpm. Since the high gain array displays three distinct nulls per revolution, fades are heard every 2/3 second when the high gain array is in use. On the other hand, a fade rate of one every 2 seconds indicates the omni is in use. The fade depth observed with the omni was quite deep according to recent observations. Also of note is the fact the omni produces linear polarization.

Based on an analysis of results of these omni tests, spacecraft controllers may opt to use the omni during the perigee period after the new schedule goes into effect.

The new AO-10 operating schedule was due to go into effect on August 1. As previously described, this austere schedule was designed to make the best of a rather dismal period; the worst AO-10 has experienced to date. The schedule will, however, offer some interesting opportunities to study the effects around perigee since the Mode B transponder will be on during perigee. The new operating schedule to be in use throughout the month of August is:

Off	MA 030 - 189
L	MA 190 - 206
B	MA 207 - 029

The MA or Mean Anomaly clock ticks off 2.73 minute-long counts beginning at perigee with 0. Each orbit is divided into 256 equal parts. Since an orbit is 699.512262 minutes long, each MA tick is $699.512262/256 = 2.732470$ minutes.

Final AMPTE Glow, Artificial Comet, Termed Success

A man-made comet launched over the Pacific Ocean was visible from Texas to Peru, and scientists called the experiment a success July 18 despite a fire that destroyed a NASA observation plane on the ground.

The creation of the artificial comet 74,000 miles above the ocean was the last in a \$78 million, international series of eight experiments designed to study how Earth's magnetic field is affected by the solar wind, an electrically charged gas that speeds from the sun at nearly 1 million mph.

"The theoreticians are having a ball with the data,"

project manager Gilbert Ousley said in a telephone interview from the Washington headquarters of the National Aeronautics and Space Administration.

"Some very good observations were made of the comet," said Johns Hopkins University researcher Richard McEntire, in a telephone interview from Baltimore.

A West German satellite released two canisters of the metallic element barium at 8:50 p.m. PDT Jul 18 from a point high above the Pacific off Tahiti. At 9 p.m. PDT, the canisters released the barium, which glowed as it was energized by solar wind, forming the artificial comet.

The man-made comet — the second ever launched — measured about 250 miles in diameter and sprouted a tail 4,500 miles long, somewhat smaller than the first man-made comet, which was created last Dec. 27 but wasn't visible to most ground observers because of cloudy weather, Ousley said.

He said four crew members and 15 scientists from NASA's Ames Research Center in Mountain View, Calif., escaped without injury as NASA's four-engine Convair 990 flying observatory blew a tire and then caught fire as it rolled down the runway at March Air Force Base, 65 miles east of downtown Los Angeles.

The fire was allowed to burn itself out, destroying the equipment-laden plane, which was used as a model in the design of the space shuttle.

The comet was seen by scientists aboard an Argentine Boeing 707 flying off the coast of Mexico, Ousley said. It also was observed by scientists on the ground at Kitt Peak National Observatory near Tucson, Ariz., McDonald Observatory in west Texas, Mount Palomar Observatory east of San Diego and an Observatory near Arequipa, Peru.

It also was seen by amateur astronomers in Phoenix, Ariz., who said "it began as a light green color, then turned red, persisted for several minutes and developed a very visible tail," which dissipated a few minutes later, Ousley said.

The artificial comets Wednesday night and last December were part of a joint American-West German-British study named AMPTE, for Active Magnetospheric Particle Tracer Explorers. In addition to the two comet-creating barium releases, the project involved six other releases of lithium and barium from the West German satellite since last September, which weren't intended to form artificial comets.

The interaction between solar wind and Earth's magnetic field causes Earth's Northern and Southern Lights and can disrupt communications on Earth and electronics aboard spacecraft.

The project involved three satellites — one from each nation launched from Cape Canaveral on Aug. 16, 1984. The West German satellite released the chemicals, then joined the other two to measure the effects. Last January, however, the British lost contact with their satellite, leaving only the American and West German spacecraft to study the latest man-made comet from space.

Participating in the experiment in a major role was NASA scientist and AMSAT member Dr. Mario Acuna, LU8HBC, an expert in geo-magnetism. Mario designed and built the magnetometers for the UoSAT spacecraft as well as the Mariner and Viking spacecraft. He works at NASA's Goddard Space Flight Center in Greenbelt, Maryland.

Tom Clark, W3IWI, Receives Honor, Plaque

AMSAT Past President Tom Clark, W3IWI, was to receive a unique plaque honoring his tenure as AMSAT President on July 27 in Tulsa, Oklahoma. The 1985 meeting of the Central States VHF Conference is being held in Tulsa. Tom has been a member of the Central States VHF Society for many years and AMSAT President WA2LQQ determined it was a suitable site for an award to Tom inasmuch as many CSVHFS members are also AMSAT members.

The CSVHFS honored W3GEY four years ago with its prestigious Chambers Memorial Technical Achievement Award.

Tom's award salutes his several extraordinary contributions to AMSAT what may be seen to have been a watershed episode which included both the loss of Phase 3A and the remarkable comeback culminating in the success of Phase 3B.

The proclamation on the plaque reads:

The AMSAT Board of Directors, on behalf of its officers and members proclaim by these presents for all to note that:

WHEREAS

The health and prosperity of our organization depends critically on the vision, wisdom and fortitude of its leaders and

WHEREAS

The role of sound leadership is seldom understood and virtually never fully appreciated in all its multivariate guises and

WHEREAS

The intellectual acumen to invent and promulgate basic tools for all to use manifestly broadens the appeal and enjoyment for all and

WHEREAS

The courage to rise up from, shrug off and move on from the ashes of disaster, as a latter-day Phoenix, stands to symbolize strength and resolve and inspires all towards ultimate success and

WHEREAS

The endurance to bear up for protracted periods under unmitigated pressure and demands and then to lead onwards to higher levels of achievement represents the soul of a successful organization,

NOW THEREFORE

We gratefully acknowledge the unique contributions of:

DR. THOMAS A. CLARK, W3IWI
President, 1980 - 1984

And bestow upon him the title

PRESIDENT EMERITUS
This 27th day of July, 1985.

Short Bursts

- AMSAT congratulates the following new Area Coordinators (AC) and Assistant Area Coordinators (AAC): Jim Roop, K0BI, and Wendell Broome, K8OO, AACs for Michigan; Jerry Elder, KA000Q, AAC for Missouri; Col John Clowe, W4ZPG and George E. Norton, W4EEE, AACs for Georgia; John Ellison, KA8TSR, AAC for West Virginia; Harry Searles, KL7JHX, AAC for Alaska; Paul Bocci, K9NO, AAC for Illinois; Alfred Forte, WD4PQN, AAC for Florida.

- AMSAT is especially pleased to announce a new position and a distinguished individual to establish the function. Dr. Joseph Berman, N8ATB, has been appointed AMSAT Public Relations Specialist. Joe is Director of the Ohio University Center for Communication Management and a welcome addition to AMSAT's leadership team!

- In ASR 105 we incorrectly stated that two teachernaut candidates were hams. In fact only one was: David Marquart, WA7QKD, a finalist, was unfortunately not the teachernaut selectee.

- At least two stations are needed to join the 20 meter AMSAT International Net team. Net Manager W8GQW has moved to Arizona and will not be on HF in the foreseeable future. N4HY is on temporary assignment in New Jersey. That leaves WD0HHU to pull the load alone. If you have a strong 20 meter signal and can devote a Sunday afternoon to doing the Net a couple of times per month at most, we need your help. A good speaking voice is helpful as is an East Coast QTH but these are not absolutes. We'll get you the bulletins if you can get them on the air. Contact WA2LQQ.

- Martha is recovering nicely after having been discharged from hospital July 13. She thanks all who thoughtfully sent greetings. She hopes to return to work in 2 to 3 weeks. Meanwhile Norma, our "temp" is keeping the office running in good order.

- AMSAT is investigating the feasibility of proposing to NASA that it be one of the experimenters granted access to an advanced geosynchronous satellite transponder for two years beginning in 1989. The Advanced Communications Technology Satellite (ACTS) will be positioned over the Western Hemisphere with both scanning and fixed beams. Among the very steep challenges involved, not the least involves fielding a 30 GHz uplink and a 20 GHz downlink earth station. AMSAT has an ad hoc pre-proposal study team looking at some NASA documents to determine if a full-scale experimental proposal is feasible. A decision on the matter is expected in a few weeks.

- KA2MUM advises that QSL cards from his PJ7 and FS DXpeditions are in the mail.

- KA2MUM also advises that new documentation packages for holders of the C-64 version of N4HY's QUIKTRAK are being sent now.

- W7HR has adapted N4HY's QUIKTRAK for the Macintosh. Beta-level tests will proceed with a field-test team during August.

- A major Western Hemisphere radio organization has been granted permission by ARRL and K2UBC to translate a Spanish language version of the Satellite Experimenter's Handbook.

• A facility dedication ceremony and kick-off meeting was to be held in combination with a Phase 3C working meeting at the Colorado AMSAT OSCAR Spacecraft Laboratory in Golden on Sunday, 28 July. AMSAT President WA2LQQ was scheduled to be on hand to present the Colorado Center of Excellence its Charter. About 20 members of the team were expected to be on hand.

- AMSAT's Video Tape Librarian Roger Johnson, WBØGAI, will soon be taking on new responsibilities in connection with his medical practice and will consequently be unable to continue in his librarian role. AMSAT therefore is seeking a competent replacement. Domestic U.S. interested candidates may contact WA2LQQ.
- No AO-10 Mode B bulletins will be scheduled until some experience in working with the eclipse schedule is obtained.

Orbit Predictions

By KA9Q

Satellite OSCAR-9
Catalog number 12888
Epoch time: 85200.42636392
Fri Jul 19 10:13:57.842 1985 UTC
Element set: 776
Inclination: 97.6321 deg
RA of node: 188.8422 deg
Eccentricity: 0.0003506
Arg of perigee: 135.6271 deg
Mean anomaly: 224.5255 deg
Mean motion: 15.27441072 rev/day
Decay rate: 1.49e-05 rev/day²
Epoch rev: 21015
Semi major axis: 6858.567 km
Anom period: 94.275323 min
Apogee: 493.101 km
Perigee: 488.291 km
Ref perigee: 2756.45100108
Fri Jul 19 10:49:26.493 1985 UTC
Beacon: 145.8250 MHz

Satellite OSCAR-11
Catalog number 14781
Epoch time: 85195.63889847
Sun Jul 14 15:20:00.827 1985 UTC
Element set: 77
Inclination: 98.1899 deg
RA of node: 261.4865 deg
Eccentricity: 0.0014164
Arg of perigee: 135.6116 deg
Mean anomaly: 224.6243 deg
Mean motion: 14.61979377 rev/day
Decay rate: 7.9e-07 rev/day²
Epoch rev: 7304
Semi major axis: 7062.004 km
Anom period: 98.496601 min
Apogee: 704.114 km
Perigee: 684.108 km
Ref perigee: 2751.66462001
Sun Jul 14 15:57:03.168 1985 UTC
Beacon: 145.8260 MHz

Satellite RS-7
Catalog number 13001
Epoch time: 85194.21998816
Sat Jul 13 05:16:46.977 1985 UTC
Element set: 207
Inclination: 82.9564 deg
RA of node: 285.7246 deg
Eccentricity: 0.0021241
Arg of perigee: 304.8248 deg
Mean anomaly: 55.0813 deg
Mean motion: 12.08692622 rev/day
Decay rate: 4e-08 rev/day²
Epoch rev: 15751
Semi major axis: 8017.695 km
Anom period: 119.136989 min
Apogee: 1670.775 km
Perigee: 1636.714 km
Ref perigee: 2750.20732956
Sat Jul 13 04:58:33.273 1985 UTC

Satellite OSCAR-10
Catalog number 14129
Epoch time: 85201.53564595
Sat Jul 20 12:51:19.810 1985 UTC
Element set: 190
Inclination: 26.2703 deg
RA of node: 128.5929 deg
Eccentricity: 0.5970867
Arg of perigee: 29.8414 deg
Mean anomaly: 353.5990 deg
Mean motion: 2.05857721 rev/day
Decay rate: -4.3e-07 rev/day²
Epoch rev: 1582
Semi major axis: 26105.323 km
Anom period: 699.512262 min
Apogee: 35315.356 km
Perigee: 4141.074 km
Ref perigee: 2757.54428325
Sat Jul 20 13:03:46.73 1985 UTC
Translate freq: 581.0047 MHz
Invert: 1
Beacon: 145.8100 MHz

Satellite STS-51F
Catalog number 0
Epoch time: 85212.77016878
Wed Jul 31 18:29:02.582 1985 UTC
Element set: rev4
Inclination: 49.5000 deg
RA of node: 120.7516 deg
Eccentricity: 0.0000000
Arg of perigee: 330.0000 deg
Mean anomaly: 30.0000 deg
Mean motion: 15.61455314 rev/day
Decay rate: 0.00025 rev/day²
Epoch rev: 32
Semi major axis: 6762.458 km
Anom period: 92.221659 min
Apogee: 387.404 km
Perigee: 387.404 km
Ref perigee: 2768.76483188
Wed Jul 31 18:21:21.474 1985 UTC

Satellite RS-5
Catalog number 12999
Epoch time: 85192.66782482
Thu Jul 11 16:01:40.64 1985 UTC
Element set: 254
Inclination: 82.9601 deg
RA of node: 291.6357 deg
Eccentricity: 0.0009847
Arg of perigee: 24.5501 deg
Mean anomaly: 335.6025 deg
Mean motion: 12.05060697 rev/day
Decay rate: 4e-08 rev/day²
Epoch rev: 15685
Semi major axis: 8033.807 km
Anom period: 119.496056 min
Apogee: 1667.209 km
Perigee: 1651.387 km
Ref perigee: 2748.67344867
Thu Jul 11 16:09:45.965 1985 UTC

Satellite RS-8
Catalog number 12998
Epoch time: 85200.51947615
Fri Jul 19 12:28:02.739 1985 UTC
Element set: 330
Inclination: 82.9581 deg
RA of node: 290.1548 deg
Eccentricity: 0.0020325
Arg of perigee: 62.8128 deg
Mean anomaly: 297.4956 deg
Mean motion: 12.02955246 rev/day
Decay rate: 4e-08 rev/day²
Epoch rev: 15752
Semi major axis: 8043.185 km
Anom period: 119.705201 min
Apogee: 1698.054 km
Perigee: 1665.359 km
Ref perigee: 2756.53390922
Fri Jul 19 12:48:49.756 1985 UTC

RS-7
Mon Jul 29 00:42:44.422 1985 UTC:
Ascending node at -40.2
Nodal period: 119.19356 min
Longitude increment: 29.925318 deg
w/orbit
Element set 207, epoch:
Sat Jul 13 05:16:46.977 1985 UTC

RS-8
Mon Jul 29 00:00:51.885 1985 UTC:
Ascending node at -21.8
Nodal period: 119.76152 min
Longitude increment: 30.067402 deg
w/orbit
Element set 330, epoch:
Fri Jul 19 12:28:02.739 1985 UTC

OSCAR-9
Mon Jul 29 01:21:10.530 1985 UTC:
Ascending node at -128.2
Nodal period: 94.33386 min
Longitude increment: 23.580934 deg
w/orbit
Element set 776, epoch:
Fri Jul 19 10:13:57.842 1985 UTC

OSCAR-11
Mon Jul 29 00:16:35.901 1985 UTC:
Ascending node at -35.0
Nodal period: 98.55503 min
Longitude increment: 24.638327 deg
w/orbit
Element set 77, epoch:
Sun Jul 14 15:20:00.827 1985 UTC

RS-5
Mon Jul 29 00:28:08.85 1985 UTC:
Ascending node at -31.4
Nodal period: 119.55247 min
Longitude increment: 30.015086 deg
w/orbit
Element set 254, epoch:
Thu Jul 11 16:01:40.64 1985 UTC

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